

movements which follow the administration of the bile-acids. I choose one of five experiments nearly all alike.

*Dec. 19th.*—The anterior cerebral hemispheres of a frog, leaving the optic thalami uninjured, removed. The foot was irritated by being plunged in water made just perceptibly acid to taste by sulphuric acid. The numbers are in seconds.

12.22. 12, 6, 7, 8, 6, 7, 6.

12.32. .5 cubic centimetre of bile-acid solution injected under the skin of the back.

12.39. 1, 2, 1, 1, 29, 27, 15, 16, 21, 28, 22, 26.

The head cut off at 1 o'clock.

1.25. 9, 9, 9, 9, 10, 10, 10.

In all cases a minute passed between the application of the irritant, and the foot was well washed with distilled water after each observation.

From these observations it would appear that the reflex irritability is greatly diminished by the bile-acids.

In conclusion I wish to express my best thanks to Professor Burdon Sanderson, F.R.S., and to Dr. Lauder Brunton, F.R.S., for their great kindness in giving me invaluable advice and assistance throughout the research. Many of the experiments were made in the Jodrell Laboratory at University College, London, under Professor Burdon Sanderson's eye; and the remainder were made in the Pharmacological Laboratory of my friend and colleague Dr. Lauder Brunton, at St. Bartholomew's Hospital.

III. "On the Structure of a Species of *Millepora* occurring at Tahiti, Society Islands." By H. N. MOSELEY, Naturalist to the 'Challenger' Expedition. Communicated by Prof. WYVILLE THOMSON, F.R.S., Director of the Civilian Scientific Staff. Received March 6, 1876.

(Abstract.)

In a paper treating mainly of the structure of *Helipora cerulea*, communicated to the Royal Society in the autumn of 1875, some account was given of results arrived at from the examination of two species of *Millepora* obtained at Bermuda and at Zamboangan, Philippines; and in that paper a summary of the literature concerning the tabulate corals generally was given. The present paper, to be considered to a certain extent a continuation of the last, gives an account of the structure of a species of *Millepora* obtained at Tahiti, Society Islands. The author commences by expressing his obligations to his colleague Mr. J. Murray, who obtained living specimens of the *Millepora* and handed them over to him with the zooids in the expanded condition for examination, and who further, having devoted some time to the study of the coral, gave him valuable information with regard to several points in its structure.

No *Millepora* appears to have been hitherto known to occur at Tahiti. The name of the species of the one the structure of which is described in the paper was not ascertained. It resembles *M. tuberculosa*, as described by Milne-Edwards\*, in outward form, but differs from it in having the calicles of two kinds disposed on the surface of the corallum in regular separate systems, in this respect resembling more closely *M. plicata*, *M. foliata*, and *M. Ehrenbergii* as described by the same author.

The coral was examined in the fresh condition, and also preserved in alcohol, chromic acid, and glycerine, and treated with osmic acid. Hardened specimens were decalcified and examined by means of sections. The corallum is a spongy mass composed of more or less contorted trabeculae of calcareous matter, which is disposed in a series of thin layers following the contours of the surface, and representing successive additions by growth. Within these layers ramify a series of canals which give off branches and subbranches, the whole ramifications being intimately connected with one another, and with the calicular cavities, by a network of smaller channels. The main canals are sometimes large enough to be easily seen by the naked eye, and run for as great a distance on the surface of the corallum as  $1\frac{1}{2}$  inch. This system of branching canals is held to be characteristic of the coralla formed by the hydroid genus *Millepora*, distinguishing it from all other coralla. The calicles are of two kinds, small and large. They are disposed on the surface of the corallum in irregularly circular systems. A large calicle occupies the centre of each system, and is surrounded by a ring of smaller calicles, usually from five to eight in number. In histological structure, as also in chemical composition†, the coralla of the genus *Millepora* seem to show no marked differences from Anthozoan coralla.

The zooids are of two kinds. The one, short and stout, occupies the larger central calicles of the systems, has from four to six short knobbed tentacles, and is provided with a mouth and certain gastric cells, closely resembling those figured by Allman as occurring in *Gemmaria implexa*‡. The other kind occupies the smaller calicles, is longer and more slender than the mouthed zooid, has from five to twenty tentacles, and no trace of a mouth. The usual number of tentacles in the mouthless zooid is about twelve to fifteen. The tentacles are larger than in the mouthed zooid, and disposed at irregular intervals along the body. They show the transverse striation, or apparent septa, so characteristic of the tentacles of hydroids. They have spheroidal heads composed of masses of thread-cells.

The zooids of both kinds are provided with well-marked longitudinal

\* Hist. Nat. des Corallaires, pl. F3. figs. 1a, 1b.

† Structure and Classification of Zoophytes, by J. D. Dana (Philadelphia, 1846), Appendix, p. 130. Corals and Coral Islands, *ejusd.* (London, 1872), p. 105.

‡ Gymnoblasic and Tubularian Hydroids, pl. viii. fig. 5.

muscular fibres, which are disposed in bundles, and are attached inferiorly to the vessels of the hydrophyton which join the somatic cavity at the base of the zooids. Circular muscular fibres are possibly also present. As in *Heliopora*, only a thin layer at the surface of the coral is living.

The soft parts of the hydrophyton consist of a network of canals and vessels occupying the corresponding canals in the corallum. The canals are composed of an ectoderm and endoderm. The ectoderm rests on a thin layer of membrane. It is mainly composed of fusiform fine granular cells with an oval nucleus, but is much modified in certain regions. In the upper part of the living layer its cells are abundantly converted into the parent cells of thread-cells, and on the actual surface into a layer of prismatic cells showing at the very surface hexagonal outlines. This layer is believed to be continuous over the whole outer surface of the coral. It is continued down into the calicular cavities, and in the contracted condition almost closes their orifices. The endoderm consists of two elements—yellow pigmented cells closely similar to those of other hydroids, and small transparent highly refracting globules. The pigmented cells are abundant in the somatic cavities of the zooids, and in the canals and vessels of the hydrophyton. They impart a bright yellow colour to the tips of the tubercles of the living coral. The canal-system of the hydrophyton anastomoses most freely with the somatic cavities of the zooids, and establishes a free communication between them. Two kinds of thread-cells are present. The one is of the peculiar form occurring only in Hydrozoa, viz. that which has in the expanded condition a short, wide, bladder-like structure at the base of the thread next the cell, which bladder is armed with three spines set in one whorl. In *Millepora* the spines are unusually long and set at right angles to the thread. This kind of thread-cell alone occurs in the tentacles; it occurs also more sparingly in the hydrophyton.

The other kind of thread-cell is larger and ovoidal in form, closely resembling that figured by Allman as occurring in *Gemmaria implexa*. These thread-cells are confined to the hydrophyton. They form densely set zones around the bases of the zooids.

The other species of *Millepora* examined appear to agree in all essential particulars with that occurring at Tahiti. They have mouthed and mouthless zooids, but these are not arranged in regular systems. They have the same two kinds of thread-cells, with a similar distribution. The Tahitian *Millepora*, like the others examined, is infested by a parasitic fungus, which exists in the soft superficial tissues, as well as in the substance of the corallum, and has a decided green tint.